SITE MANAGEMENT
AND
MONITORING PLAN

FOR THE

NEW WILMINGTON
OCEAN DREDGED MATERIAL DISPOSAL SITE

August 2002

The following Site Management and Monitoring Plan for the New Wilmington ODMDS has been developed and agreed to pursuant to the Water Resources Development Act Amendments of 1992 (WRDA 92) to the Marine Protection, Research, and Sanctuaries Act of 1972 for the management and monitoring of ocean disposal activities, as resources allow, by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers.

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This plan is effective from date of signature for a period not to exceed 10 years. The plan shall be reviewed and revised more frequently if site use and conditions at site indicate a need for revision.

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NOVEMBER 2000

INTRODUCTION

Under the MPRSA (Marine Protection, Research, and Sanctuaries Act) of 1972, it is the responsibility of the EPA (U.S. Environmental Protection Agency) and the CE (U.S. Army Corps of Engineers) to monitor and manage Ocean Dredged Material Disposal Sites (ODMDS). The goal of this management is to ensure that ocean dredged material disposal activities will not unreasonably degrade the marine environment or endanger human health or economic potential. MPRSA, WRDA (the Water Resources Development Act) of 1992, and a Memorandum of Agreement between EPA and COE requires the development of a SMMP (site management and monitoring plan) to specifically address the disposal of dredged material at the New Wilmington ODMDS. Following an opportunity for public review and comment, the SMMP provisions will be requirements for all disposal activities at the site. **All section 103 (MPRSA) ocean disposal permits or evaluations shall be conditioned as necessary to assure consistency with the SMMP**.

This SMMP has been prepared in accordance with the Guidance Document for Development of Site Management Plans for Ocean Dredged Material Disposal Sites (EPA and CE, 1996). This document provides a framework for the development of site monitoring and management plans required by MPRSA and WRDA. The SMMP may be modified if it is determined that such changes are warranted as a result of information obtained during the monitoring process. The SMMP will be reviewed and revised as needed or every ten years, whichever time period is shorter.

SCOPE OF THE SMMP

ODMDS management involves a broad range of activities including regulating the schedule of use, the quantity, and the physical/chemical characteristics of dredged materials dumped at the site. It also involves establishing disposal controls, conditions and requirements to avoid and minimize potential impacts to the marine environment. Finally, ODMDS management involves monitoring the site environs to verify that unanticipated or significant adverse effects are not occurring from past or continued use of the site and that permit conditions are met.

MPRSA, as amended by WRDA 1992, provides that the SMMP shall include but not be limited to:

- A baseline assessment of conditions at the site;
- A program for monitoring the site;
- Special management conditions or practices to be implemented at each site that are necessary for the protection of the environment;
- Consideration of the quantity and physical/chemical characteristics of dredged materials to be disposed of at the site;
- Consideration of the anticipated use of the site over the long term;
- A schedule for review and revision of the plan.

OBJECTIVES OF SITE MANAGEMENT

There are three primary objectives in the management of the New Wilmington ODMDS:

- Protection of the marine environment, living resources, and human health and welfare;
- Documentation of disposal activities at the ODMDS and provision of information which is useful in managing the dredged material disposal activities;
- Provide for beneficial use of dredged material whenever practical.

The objective of the SMMP is to provide guidelines in making management decisions necessary to fulfill mandated responsibilities to protect the marine environment as discussed previously. Risk-free decision-making is an impossible goal, however, an appropriate SMMP can narrow the uncertainty.

NEW WILMINGTON OCEAN DREDGED MATERIAL DISPOSAL SITE (ODMDS)

The New Wilmington ODMDS (Figure 1) is proposed for designated by EPA pursuant to Section 102(c) of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, as suitable for the ocean disposal of dredged material. The site is discussed in a Draft Environmental Impact Statement (EIS). The implementation of this SMMP is dependent on the public and agency review of the EIS and final designation rule promulgated by EPA.

The boundary coordinates for the New Wilmington ODMDS are:
$33^{o}46'N$ $78^{o}02.5'W$
$33^{o}46'N$ $78^{o}01'W$
$33^{o}41'N$ $78^{o}01'W$
$33^{o}41'N$ $78^{o}04'W$.
Depths range from approximately 52 feet to 35 feet below mlw. The site is approximately 5 nautical miles offshore of Baldhead Island.

DISPOSAL HISTORY

Use of the New Wilmington ODMDS. The New Wilmington ODMDS site has not been previously used for dredged material disposal.

Historical Use of the Existing Wilmington ODMDS. Disposal of dredged materials in the ocean has been associated with the Wilmington Harbor Federal navigation project and the Military Ocean Terminal at Sunny Point (MOTSU) for many years. The Cape Fear River ocean bar channel has been maintained by the Federal Government for well over 100 years. The Wilmington Harbor Federal navigation project consists of a series of channels or "reaches" extending from the ocean bar channel at the mouth of the Cape Fear River to a point above Wilmington, North Carolina (Figure 2). Continued use of the Wilmington Harbor navigation channel depends upon maintenance dredging. Annual maintenance dredging is required at project extremes, the ocean bar and anchorage basin and approaches at Wilmington Harbor. Reaches or channels between those extremes require maintenance but generally less frequently and with less volume of dredged material than the ocean bar channels or the anchorage basin and approaches at Wilmington Harbor. MOTSU is a military port facility located on the west-bank of the Cape Fear River, approximately 10 miles upstream from the river's mouth. MOTSU requires annual maintenance dredging to meet its mission requirements.

Dredged materials placed in the existing Wilmington ODMDS come from three general areas within the Cape Fear River: the Wilmington Harbor Federal navigation project, ocean bar channels (WH-OB); the Wilmington Harbor Federal navigation 42-foot project, the navigation channel to Wilmington excluding the ocean bar and portions above the Lower Brunswick channel (WH-NAV); and MOTSU (Military Ocean Terminal Sunny Point). Since 1987, the date of site designation, approximately 27 million cubic yards of dredged materials have been placed within the Wilmington ODMDS (Table 1). Between 1987 and 1998, the average annual volume of dredged material ocean disposed was about 2 million cubic yards.

Table 1. Volume of dredged materials placed in the Wilmington ODMDS area. Data source is COE Wilmington District unpublished dredging records.

DREDGED MATERIAL QUANTITY – CUBIC YARDS				
YEAR	**WH-OB**	**WH-NAV**	**MOTSU**	**YEAR TOTAL**
1976	1,157,161	0	0	1,157,161
1977	218,624	0	0	218,624
1978	523,803	0	0	523,803
1979	138,817	0	0	138,817
1980	951,935	0	0	951,935
1981	376,942	0	0	376,942
1982	850,621	0	0	850,621
1983	1,018,839	0	0	1,018,839
1984	1,297,202	0	0	1,297,202
1985	190,633	0	0	190,633
1986	756,423	0	0	756,423
1987	1,571,976	0	983,250	2,555,226
1988	0	597,568	0	597,568
1989	1,124,408	0	1,255,134	2,379,542
1990	524,267	0	1,047,290	1,571,557
1991	427,176	466,349	0	893,525
1992	1,051,328	0	773,950	1,825,278
1993	749,800	0	945,255	1,695,055
1994	1,040,600	0	549,770	1,590,370
1995	1,594,295	1,633,852	398,111	3,626,258
1996	1,000,000	345,430	3,683,330	5,028,760
1997	1,444,000	217,294	132,914	1,794,208
1998	901,988	196,442	1,473,582	2,572,012
1999	675,549	0	825,000	1,500,549
1976-1999	19,586,387	3,456,935	12,067,586	35,110,908
1987-1999	12,105,387	3,456,935	12,067,586	27,629,908

Note: WH-OB – Baldhead Shoal through Battery Island Channels, inclusive.
WH-NAV – Lower Swash through portions of Lower Brunswick channels.
MOTSU – Materials associated with MOTSU only.

Material Management Plan (DMMP) Wilmington Harbor, North Carolina, June 1996.
U.S. Army Corps of Engineers, Wilmington District – Ocean Disposal Database and Contract Dredging Records.

CHARACTERISTICS OF DREDGED MATERIALS

Grain Size. The sediments dredged from navigation channels in the Cape Fear River include ocean source (sandy, littoral materials), river source (fine grained sands, silts, and clays derived from easily eroded soils from the upper Cape Fear River basin), and mixtures of both. Shoals occur where specific physical factors promote deposition or movement of sediments. These factors may vary spatially and temporally. Table 2 indicates the grain size characteristics of Wilmington Harbor channel sediments and divides the Wilmington Harbor project into broad groups by sediment characteristics. Based on the grain size data, some Wilmington Harbor channel sediments have significant silt and clay components and therefore do not meet Part 227.13(b) criteria for exclusion from further evaluation. For those materials, additional information is necessary to determine compliance with the Ocean Dumping Regulations and Criteria.

Table 2. Grain size characteristics of Wilmington Harbor and MOTSU channel sediments. See Figure 3.

Channel	%Gravel	%Sand	% Silt & Clay	Sediment Grouping
Bald Head Shoal				
Offshore reaches	0.0	73.2	26.8	Silty Offshore
Inlet Reaches	0.0	98.7	1.3	
Smith Island	7.9	92.0	0.1	
Caswell-Southport	18.0	80.5	1.5	
Southport	12.5	85.5	2.0	Sandy
Battery Island	38.0	61.0	1.0	Lower Project
Lower Swash	27.0	70.0	3.0	Reaches
Horseshoe Shoal	0.0	98.0	2.0	
Reaves Point	0.0	99.0	1.0	
Lower Midnight	0.0	76.0	24.0	
Upper Midnight	0.0	82.5	17.5	
Lower Lilliput	0.0	53.5	46.5	
Upper Lilliput	0.0	98.0	2.0	Varied
Keg Island	0.0	63.0	37.0	Mid-Project
Upper and Lower Big Island	2.0	94.0	3.0	Reaches
Lower Brunswick	0.0	92.7	7.3	
Upper Brunswick	0.0	57.0	43.0	
Fourth East and Between	0.0	80.0	20.0	
Anchorage Basin	0.0	6.0	94.0	
Between Memorial and Hilton Railroad Bridges	10.0	55.0	35.0	Silty Upper-Project
Above Hilton Railroad Bridge	0.0	58.0	42.0	Reaches
MOTSU*	0.0	30.0	70.0	Silty Riverine

Note: Gravel - grain size larger than 5.0 mm
Sand - grain size between 0.07 and 5.0 mm
Silt and Clay - grain size smaller than 0.07 mm
Source: USACE 1996 except for * which is USACE 1993.

Chemical and Biological Testing of Sediments. Representative samples of fine-grained sediments from the Wilmington Harbor channels and the MOTSU basins which are dredged and placed in the Wilmington ODMDS have been chemically and biologically tested several times since 1978 and the sediments found acceptable for ocean disposal.

DISPOSAL METHODS

Disposal of dredged material at the New Wilmington ODMDS will occur using two methods; by hopper dredge, and by tug and barge or scow. For "ocean bar" reaches, shoal material is usually removed and transported to the ODMDS by a hopper dredge. Hopper dredges are designed to hydraulically dredge sediments, load and retain solids in the hoppers, and then haul them to the disposal site where disposal is accomplished by dumping through doors in the bottom of the hoppers or through the hull. For the interior river reaches, shoal material is usually removed by clamshell or bucket dredge. Dredged materials are mechanically picked up by the bucket and placed into a 2,000 to 7,000 cubic yard capacity scow moored next to the dredge. When full, the scow is pulled by a tug to the ODMDS and the load discharged through the bottom of the scow.

MANAGEMENT AND MONITORING CONCERNS OR ISSUES

Material Transport. The status, movement, and stability of dredged material following placement within the new ODMDS is a major management issue. How the dredged material acts following placement determines many environmental effects. The fate of the dredged material including dredged material disposal mounds is important in site management.

Site Use Management, Implementation, and Documentation. The best efforts of environmental management are for naught if the actual site use is not carried out in a manner that fulfills those management goals and objectives. The site use information must be readily available and used to facilitate monitoring and management. Correct implementation of the ocean disposal specifications is a management concern. Dredging equipment, particularly navigation and documentation has improved significantly in recent years and use of these technology improvements is a management goal.

Wood Debris Shrimp fishermen fishing areas near the existing Wilmington ODMDS have reported fouling and tearing of their nets with roots, tree limbs, and other natural origin wood debris making traditional shrimp trawling areas unusable. They attribute the wood debris to the ocean disposal of dredged material from the "river" reaches of the Wilmington Harbor navigation channel and the Military Ocean Terminal, Sunny Point. The Wilmington ODMDS is immediately adjacent to and partially overlaps important shrimp trawling areas. Based on these reports a management plan was developed and included in the Wilmington ODMDS Site Monitoring and Management Plan dated November 1996. Implementation of the plan has apparently reduced wood debris problems.

Shrimping areas are located in the vicinity of the New Wilmington ODMDS, although not as near as old Wilmington ODMDS. Accordingly, wood debris associated with the dredged material remains a management issue

OCEAN DREDGED MATERIAL SITE MANAGEMENT

All ocean disposal at the New Wilmington ODMDS must be conducted in accordance with the Ocean Dumping Regulations and Criteria (40 CFR Parts 220-229), whether conducted as a permit activity or as a Federal activity. The following are New Wilmington ODMDS management requirements and all permits or evaluation concurrence shall be conditioned to include these requirements.

Types of Dredged Materials To Be Disposed

Material Evaluation. Only dredged materials which have been evaluated in accordance with EPA's Ocean Dumping Regulations and Criteria and found acceptable will be accepted for unrestricted disposal in the New Wilmington ODMDS.

Guidance for evaluation of dredged materials under the MPRSA Section 103 program is provided in the Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual, February 1991 and the Regional Implementation Manual, Requirements and Procedures for Evaluation of the Ocean Disposal of Dredged Materials in Southeastern Atlantic and Gulf Coastal Waters, May 1993. The determination of dredged material suitability for ocean disposal must be documented in a MPRSA Section 103 evaluation and approved by EPA Region 4 prior to disposal. Dredged materials will be reevaluated for suitability for ocean disposal in accordance with current COE/EPA guidance at an interval not to exceed three years. Reevaluation and testing procedures should be coordinated with the Wilmington District COE and EPA Region 4 before any sampling or testing.

Dredged Material Suitable for Beneficial Uses. Beneficial uses refers to the concept that dredged material can be disposed in a way that is economically and environmentally acceptable and accrues natural resource benefits to society.

Beach-compatible dredged materials (sands) dredged from the ocean bar or river navigation channel should be placed on nearby beaches or within the active littoral system when it is economically feasible and environmentally acceptable to do so. Site capacity and mounding problems are favorably affected by not placing beach compatible sands in the ODMDS. Other beneficial uses of dredged materials, such as their use to enhance or develop fisheries resource features (reefs or berms), use to restore colonial nesting waterbird islands in the Cape Fear River, or use as building material or soil, are also encouraged with appropriate environmental review.

Dredged Material With Wood Debris. If significant quantities of debris (either wood or man-made) are present in the dredged materials, then debris management should be conducted. Significant quantities of debris are considered to be those which would materially interfere with fishing in areas near the New Wilmington ODMDS. Debris management may involve the following:

- Removal of the debris from the dredged material before transportation to the ODMDS;
- Placement of dredged material in the ODMDS in a location (e.g., farthest distance possible from the fishing areas) such that debris interference with nearby fishing areas is unlikely;
- Immobilizing the debris within the ODMDS by covering it (capping) with dredged material.

Methods of Disposal. Disposal may be by hopper dredge or dump scow. For each disposal project, a specific area within the ODMDS will be designated for use and a specific placement pattern will be prescribed. Dredged materials will be discharged within the ODMDS boundaries. Dredged material placement will not be allowed closer than 600 feet from the site boundary. The placement of dredged materials outside the ODMDS boundaries is not acceptable under MPRSA authorities. An approved ocean disposal verification plan must be carried out. Placement methods that minimize mounding of dredged material within the designated placement area will be required.

Specific procedures which accomplish these goals are discussed under the **Specific Requirements** section which follows.

Disposal Quantities. Quantities of dredged materials placed within the ODMDS will be limited to those amounts that do not produce unacceptable adverse effects to human health and welfare and the marine environment or human uses of that environment (as defined in EPA's Ocean Dumping Regulations and Criteria). The disposal quantity management objective for the New Wilmington ODMDS is to regulate disposal quantities such that depths in the disposal area following disposal do not interfere with navigation. The disposal depth limitation will be -30 feet m.l.l.w. Current average depths in the ODMDS are approximately -45 feet m.l.l.w.

Timing of Disposal. There are no seasonal restrictions to the placement of dredged material within the New Wilmington ODMDS. However, seasonal restrictions and seasonal special requirements apply to particular dredging activities at particular locations.

SPECIFIC REQUIREMENTS

Ocean Disposal Verification. The vessels used for dredge material disposal will be required to operate under an approved verification plan. The location and quantity of each disposal load placed within the New Wilmington ODMDS must be maintained in a computerized database. All exception loads (i.e., reported disposal out of the ODMDS boundaries or no location reported) will be documented and the disposal operator questioned to determine what occurred and the reason for the exception. The verification plan will include an automated system that will record the horizontal location and draft condition of the disposal vessel from the time it enters Baldhead Shoal Channel outbound until it leaves Baldhead Shoal Channel inbound. Vessel positioning as a minimum shall be global positioning system. Minimum required data for each load is as follows:

- Dredge or vessel name;
- Sequential load number;
- Date;
- Time, vessel position, and draft - in one minute intervals for the disposal cycle specified previously, positioning in North Carolina state plane coordinates, draft in feet;
- Begin and end dump event times and positions;
- Source of dredged material, i.e., reach name;
- Volume of dredged material disposed.

These data shall be available on a daily basis. No vessel shall leave for the disposal site without the ability to collect and record the ocean disposal verification data specified. The disposal positions reported shall be those of the disposal vessel itself (i.e., the scow not the tug). The submittal of data in electronic formats which facilitate application of GIS is encouraged.

A summary report of operations shall be provided by the Wilmington District COE to the EPA, Region 4, Ocean Dumping Coordinator at the completion of the dredging/ocean disposal project or activity. For work under a Section 103 permit, the permit holder will be responsible for providing the requested information to the COE. Minimum required data to be included in the summary report is as follows:

- General Information
  1). Project name;
  2). Location;
  3). Public notice or permit date;
  4). Section 103 evaluation date;

- Disposal Site Used;
- Project Type - Either Federal or Section 103 permit;
- Type of Work - New or maintenance work;
- Method of Dredging and Disposal;
- Disposal Dates - Range of disposal dates - start to finish;
- Quantity of Dredged Material Disposed - in cubic yards;
- Point of Contact for Project.

Designated Route To and From the New Wilmington ODMDS. A transportation route to and from the New Wilmington ODMDS will be specified to minimize possible interference with nearby fishing grounds and commercial navigation. This route will be developed following coordination with interested parties. The ocean disposal verification plan discussed previously provides verification that the approved route was taken.

Disposal 'Zones' Within the ODMDS. To manage site use, maximize site capacity, reduce multiple user conflicts, simplify monitoring and management, and reduce potential adverse impacts to the marine environment, the Wilmington District COE in consultation with EPA Region 4, will designate zones within the ODMDS for dredged materials from each specific ocean dumping activity. Site monitoring data will be used to adjust these zones relative to current site conditions. The location of these zones will be adjusted using monitoring information.

Control of Mounding. Dredged material disposal shall be conducted so that a minimum depth of -30 feet m.l.l.w. shall be maintained. A clearance of 30 feet above the bottom will be maintained. The disposal zones will be divided into appropriate grids of disposal cells to be sequentially used to ensure dispersal or spreading of the dredged material rather than mounding. Depths at the time of disposal will be monitored to detect if adjustment of disposal methods is needed to prevent unacceptable mounding.

Emergency Dumps. If an emergency discharge of dredged material outside the ODMDS occurs, the site user must notify the EPA Region 4, Ocean Dumping Coordinator (and the Wilmington District COE Ocean Dumping Coordinator for a Section103 permit activity). The site user shall provide in writing within 2 days of the emergency dump, the reason for the emergency, and the location of the dump. If, in the opinion of EPA, the misplaced dredged materials are a hazard to the marine environment and its uses, the site user shall remove such material and deposit it where directed.

BASELINE ASSESSMENT OF CONDITIONS AT THE NEW WILMINGTON ODMDS

Site Designation EIS Baseline

Baseline conditions at the New Wilmington ODMDS are principally reported in the site designation Environmental Impact Statement (EPA and USACE, 2000) and the Site Characterization Study (EPA, 2000). This baseline data includes information referenced from the scientific literature and information compiled from field surveys at the New Wilmington ODMDS. The field survey data included: water and sediment chemistry; benthic macroinfauna; and site currents. Side scan and echosounding records were also extensively used.

Information Obtained For Site Designation

Site evaluations and monitoring in the course of site designation have produced information in the following areas.

Bathymetry. Figures 4 illustrates bathymetry of the New Wilmington ODMDS.

Sediment Characterizations. A reconnaissance survey of marine sediments within a 28 square nautical mile area (Figure 5) was undertaken in 1997 (USACE 1999). Median grain size of sediments in this area ranged from .0797 mm to 0.770 mm. The % fines (silt and clay) ranged from 0% to 35.5%. However, the median percentage of fines was 4.4%. Figure 6 illustrates the particle size distribution for samples collected in the 28 square nautical mile area. The organic content of the sediment ranged from 0.56% to 3.98%. Chemical characterizations of marine sediments within the site selection study area were performed and results are summarized in EPA (2000).

Benthic Communities. In 1998 a benthic survey of a 28 square nautical mile area (Figure 5) which encompasses the proposed Frying Pan Site (USACE 1999). A total of 21,832 organisms representing 311 taxa were identified from 28 blocks (stations)(8 or more grab samples per block). Annelids (Polychaeta) were the most numerous taxa representing 39.7% of the total assemblage, followed in abundance by arthropods (malacostracans) (23.7%), and molluscs (gastropods (14.1%) and bivalves (01.9%)). Gastropods represented 34.3 % of the total number of individuals followed by polychaetes (30.7%) and bivalves (18.4%). Dominant taxa included the gastropod Caecum pulchellum, the bivalve Lucina radians, and the polychaete, Apoprionospio pygmaea. Mean densities ranged from 538 to 6019 organisms per square meter. The highest densities were found in the more offshore stations sampled. The greatest number of taxa tended to be located on the eastern-most edge of the area sampled. Mean station biomass ranged from 27.4 to 836.4 grams per square meter (wet-weight). A 2220.1 grams per square meter biomass sample was obtained but was considered an outlier due to the presence in that sample of large echinoderms which contained calcium carbonate endoskeletons. A statistical analysis indicated that there was a relatively homogenous distribution of the taxa between the stations sampled. There was, however, a significant correlation between density and sediment grain size characteristics. Density was significantly positively correlated with sediment percent silt and clay.

A reconnaissance survey of hard bottom habitats in the project area was undertaken for this EIS. The evaluation included review of side scan sonar records and echosounder profiles. A limited amount of underwater video, SCUBA diver observations, and bottom grab or core samples helped verify interpretations of the side scan records. The hard bottom habitats evidenced in these studies are summarized in Figure 7.

SITE MONITORING

Goals of Site Monitoring. Site monitoring is conducted to ensure the environmental integrity of an ocean dredged material disposal site and to verify compliance with site designation criteria, any special site management conditions, and with permit conditions or federal authorization requirements. Monitoring should provide useful and pertinent information to support site management decisions. The main purpose of disposal site monitoring is to determine whether site management practices, including disposal operations need to be changed to avoid unacceptable impacts or to provide benefits to resource conditions. Site monitoring is not a stand alone activity. It is based on the site designation process, the characteristics of the dredged materials, and compliance with authorized activities.

To use site monitoring as an effective tool, site managers need to define in quantitative terms thresholds for unacceptable impacts and desired beneficial effects of dredged material disposal. Exceeding or not exceeding the thresholds triggers specific management actions. A tiered strategy for a monitoring program is desirable. With a tiered approach, an unacceptable result may trigger further and often more complex monitoring. Continuous monitoring of all physical, chemical, and biological parameters and resources in and around the ocean dredged material disposal site is not necessary. A monitoring program should be structured to address specific questions (hypotheses) and measure key indicators and endpoints, particularly those defined during site designation or specific project issues that arise. For the New Wilmington ODMDS, the site designation environmental impact statement identified navigation, fishing (shrimping), and hard bottoms in nearby waters are resources of concern. These resources were not present within the site.

New Wilmington ODMDS Monitoring. The objectives of the site monitoring plan for the New Wilmington ODMDS are to provide information to:

- Determine if the disposal activities are in compliance with site use restrictions and permit conditions;
- Determine the short and long-term fate of dredged materials placed at the site;
- Determine the effect of the dredged material disposal on uses of the marine environment within and outside the ODMDS.

Monitoring Methods and Rationale. Monitoring strategies are proposed for the New Wilmington ODMDS and thresholds for management actions are presented in Table 3 and discussed in the following paragraphs. These methods will provide information to address specific and current management issues at the site including; mounding (and site capacity); wood debris in dredged materials being transported to nearby shrimping grounds; dumps occurring outside the disposal area; and movement or fate of material. As indicated in Table 3, information obtained during monitoring may indicate the need for additional monitoring at a higher, more complex, level. If more intensive monitoring is required, this monitoring plan must be revised and additional thresholds for action established.

Site Bathymetry. Before and after single transducer surveys of the areas of active placement will be conducted for each disposal activity. Positioning using GPS will be required. Survey line spacing will be at most 100 feet. The vertical datum shall be m.l.l.w (mean lower low water) and the UTM, NAD 1983.

Every 3 years, a site bathymetry survey of the active disposal areas will be conducted using a multibeam system.

The survey data will be made available as a coordinate data file in an electronic format specified by the Wilmington District COE and EPA Region 4. Pre-disposal and post-disposal surveys will be evaluated using surface modeling techniques. Consecutive surveys will be compared to establish apparent net direction of sediment movement. Estimates will be made of the quantities and types of materials retained within the ODMDS as compared to those dispersed off site. The ocean disposal verification data base will be used to associate dredging project information with bathymetric features observed.

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Table 3. New Wilmington ODMDS Monitoring Strategies and Thresholds for Action.

STRATEGY	THRESHOLD	MANAGEMENT OPTIONS	
Monitoring Strategy	**Predefined Threshold For Action**	**Threshold Not Exceeded**	**Threshold Exceeded**
Site Bathymetry	Mound Height > -30' m.l.l.w.	* Continue monitoring after each disposal activity (project completion)	* Move disposal points within site * Limit quantity of material * Remove material above –25' mllw * Cease use of specific area of site * Notify mariners of mound location and height
	Mound height approaching –30' m.l.l.w.	* Continue monitoring after each disposal activity (project completion)	* Move disposal points within site * Continue use of area but increase frequency of monitoring * Limit dredge material quantities placed at site
Site Bathymetry – Sequential Survey Analysis	Sequential surveys indicate significant erosion of disposal mounds.	* Continue monitoring after each disposal activity (project completion) * Continue monitoring at a reduced level * Stop monitoring	* Move disposal points within site * Increase monitoring level to assess impacts of material movement * Reduce quantities placed at site
Other Survey Techniques	Monitoring information indicates significant erosion of disposal mounds.	* Continue monitoring at a reduced level * Stop monitoring	* Increase level of monitoring * Implement a removal or remediation action * Reduce quantities of debris associated with dredged material
Disposal Site Use Records	Disposal records required by SMMP are not submitted or are incomplete	* Continue monitoring at same level	* Restrict site use until requirements are met
	Review of records indicates a dump occurred at a location other than as directed	* Continue monitoring at same level	* Dump occurred outside ODMDS boundary: Notify EPA-Region 4 and State of NC. Investigate why off-site dump(s) occurred. Remove material from off-site dump(s) if a hazard to navigation or the environment * Dump occurred in ODMDS but not in target area: Direct placement to occur as specified
Evaluation of Direction and Magnitude of Material Movement Using Numerical Models	Evaluations indicate the potential to move back to navigation channel or to adjacent fishing areas	* Continue monitoring at a reduced level * Stop monitoring * Continue monitoring at same level	* Increase level of monitoring * Collect additional information needed to refine predictions * Change operational considerations, *i.e.*, location and method of placement

Evaluation of Direction and Magnitude of Material Movement. The extent and probable direction in which local waves and currents erode and transport the dredged material mounds may be important in determining potential effects of site use on adjacent marine resources and in managing use of the site. Sediment dispersion can increase site capacity but also make material available for transport to undesirable locations. Numerical simulation models such as LTFATE (Long-term Fate of Dredged Material Disposed in Open Water) and MDFATE (Fate of Dredged Material from Multiple Disposals in Open Water) which couple hydrodynamic and sediment transport equations will be used to evaluate dredged material movement at the New Wilmington ODMDS. These models are included in the COE's PC based ADDAMS (Automated Dredging and Disposal Alternatives Modeling System) software. These evaluations will be conducted by Wilmington District COE and EPA Region 4.

Other Survey Techniques. Additional survey techniques such as side scan sonar, video records, still photography, bottom grab samples (benthos surveys and sediment physical characterizations), sediment mapping (using gamma spectroscopy and/or x-ray fluorescence methods), and vertical sediment profiling will be used as necessary to determine the effects of disposal in the New Wilmington ODMDS.

The use of these techniques will be coordinated with the Wilmington District COE and EPA Region 4.

Disposal Site Use Records. All dredged material disposal activities at the New Wilmington ODMDS will be conducted under an approved verification plan. The Wilmington District COE will maintain a database of site use. The documented site use information along with other information collected during monitoring will be used to direct future ocean disposal and monitoring activities. The data requirements were discussed previously.

Data Reporting. An annual summary report of monitoring activities and results shall be prepared by the Ocean Dumping Coordinators of the Wilmington District COE and EPA Region 4.

ANTICIPATED SITE USE

It is anticipated that there will be a need for use of the New Wilmington ODMDS for many years. The anticipated site can be expected to be between 2 and 3 million cubic yards per year. This projection is based on 1970-1999 dredging records, currently available dredged material disposal options, and Wilmington District COE planning documents. The estimate likely represent the high end of the potential range of quantities as efforts are underway to develop alternative dredged material disposal methods, particularly for mid-river areas and areas where sandy sediments predominate.

MODIFICATION OF THE NEW WILMINGTON ODMDS SMMP

Should the results of the monitoring surveys or valid reports from other sources indicate that continued use of the ODMDS would lead to unacceptable effects, then the ODMDS management will be modified to mitigate the adverse effects. The SMMP will be reviewed and updated at least every 10 years. The SMMP will be reviewed and updated as necessary if site use changes significantly. For example, the SMMP will be reviewed if the quantity or type of dredged material placed at site changes significantly or if conditions at the site indicate a need for revision. The plan should be updated in conjunction with activities authorizing use of the site.

IMPLEMENTATION OF THE NEW WILMINGTON ODMDS SMMP

This plan shall be effective from date of signature for a period not to exceed 10 years. The EPA and the COE shall share responsibility for implementation of the SMMP. Site users may be required to undertake monitoring activities as a condition of their permit. The COE will be responsible for implementation of the SMMP for Federal maintenance and new work projects.

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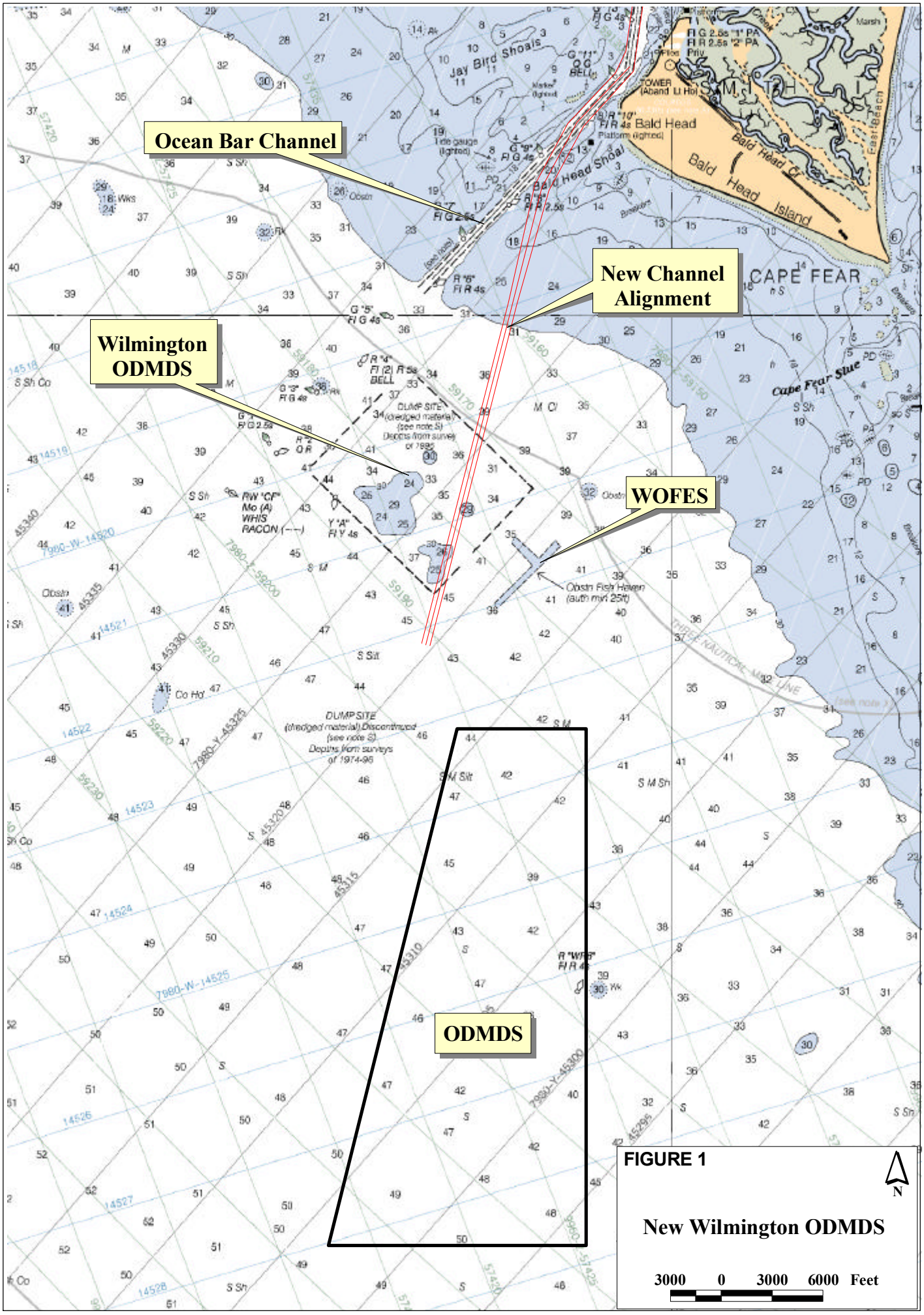
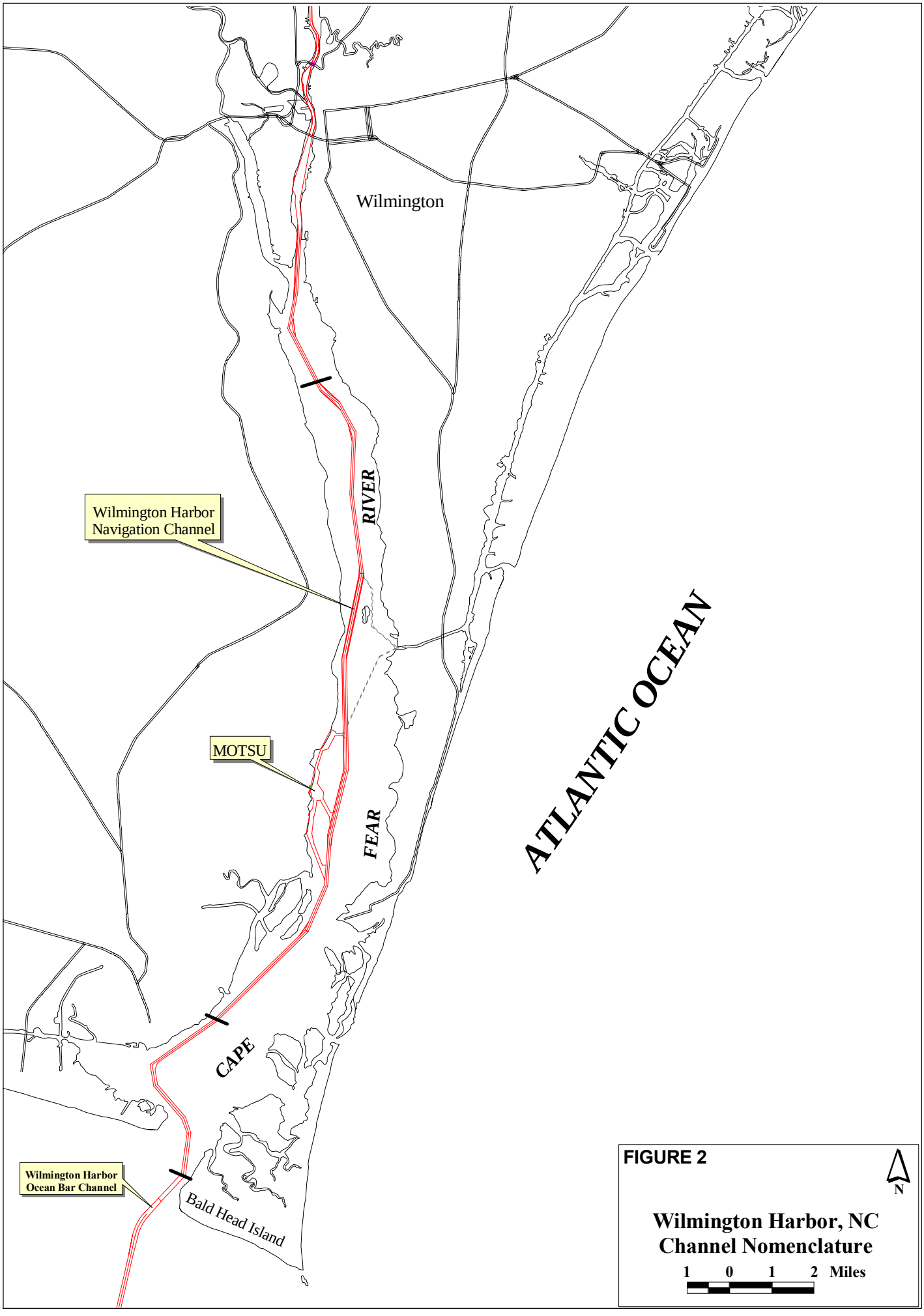
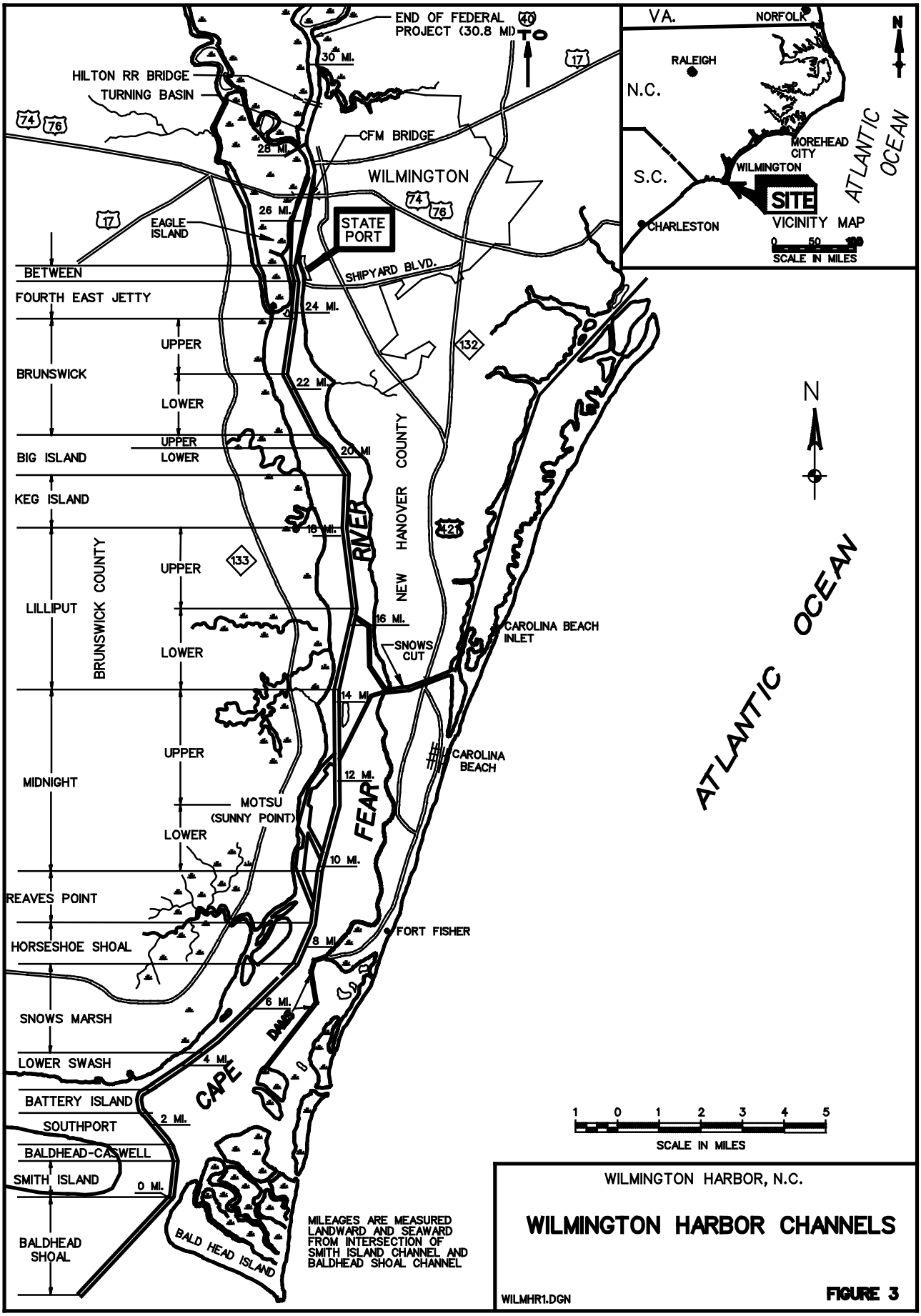
Vittor, Barry A., & Associates, Inc. 1999. *Wilmington, North Carolina ODMDS 1998 Biological Assessment*. June. Prepared for Wilmington District, U. S. Army Corps of Engineers.


Ocean Bar Channel
New Channel Alignment
Wilmington ODMDS
WOFES
ODMDS
Bald Head Island
CAPE FEAR
Jay Bird Shoals
Bald Head Shoal
Cape Fear Slue
DUMP SITE (dredged material) (see note 5) Depths from surveys of 1974-96
DUMP SITE (dredged material) Discontinued (see note 5) Depths from surveys of 1974-96
Obstn Fish Haven (auth mrk 25ft)
THREE NAUTICAL MILE LINE
FIGURE 1
N
New Wilmington ODMDS
3000 0 3000 6000 Feet


Wilmington
Wilmington Harbor
Navigation Channel
RIVER
MOTSU
FEAR
ATLANTIC OCEAN
CAPE
Wilmington Harbor
Ocean Bar Channel
Bald Head Island
FIGURE 2
N
Wilmington Harbor, NC
Channel Nomenclature
1 0 1 2 Miles

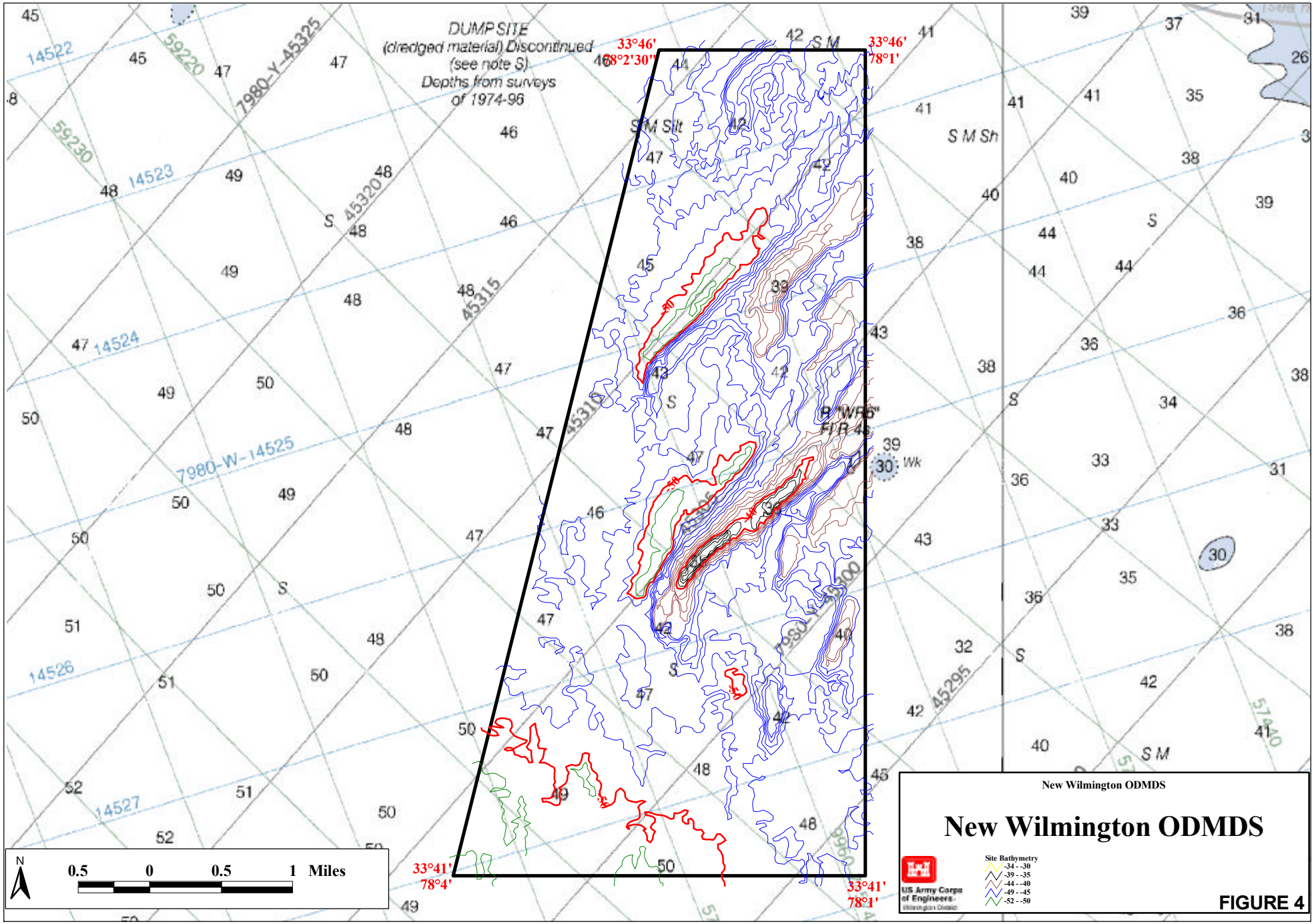


WILMINGTON HARBOR, N.C.

WILMINGTON HARBOR CHANNELS

WILMHR1.DGN

FIGURE 3


DUMP SITE
(dredged material) Discontinued
(see note S)
Depths from surveys
of 1974-96
33°46'
78°2'30"
33°46'
78°1'
33°41'
78°4'
33°41'
78°1'
S M Slt
S M Sh
S M
14522
14523
14524
14525
14526
14527
7980-Y-45325
7980-W-14525
59220
59230
45320
45315
45310
45295
57440
N
0.5 0 0.5 1 Miles
New Wilmington ODMDS
New Wilmington ODMDS
US Army Corps of Engineers
Site Bathymetry
-34 - -30
-39 - -35
-44 - -40
-49 - -45
-52 - -50
FIGURE 4

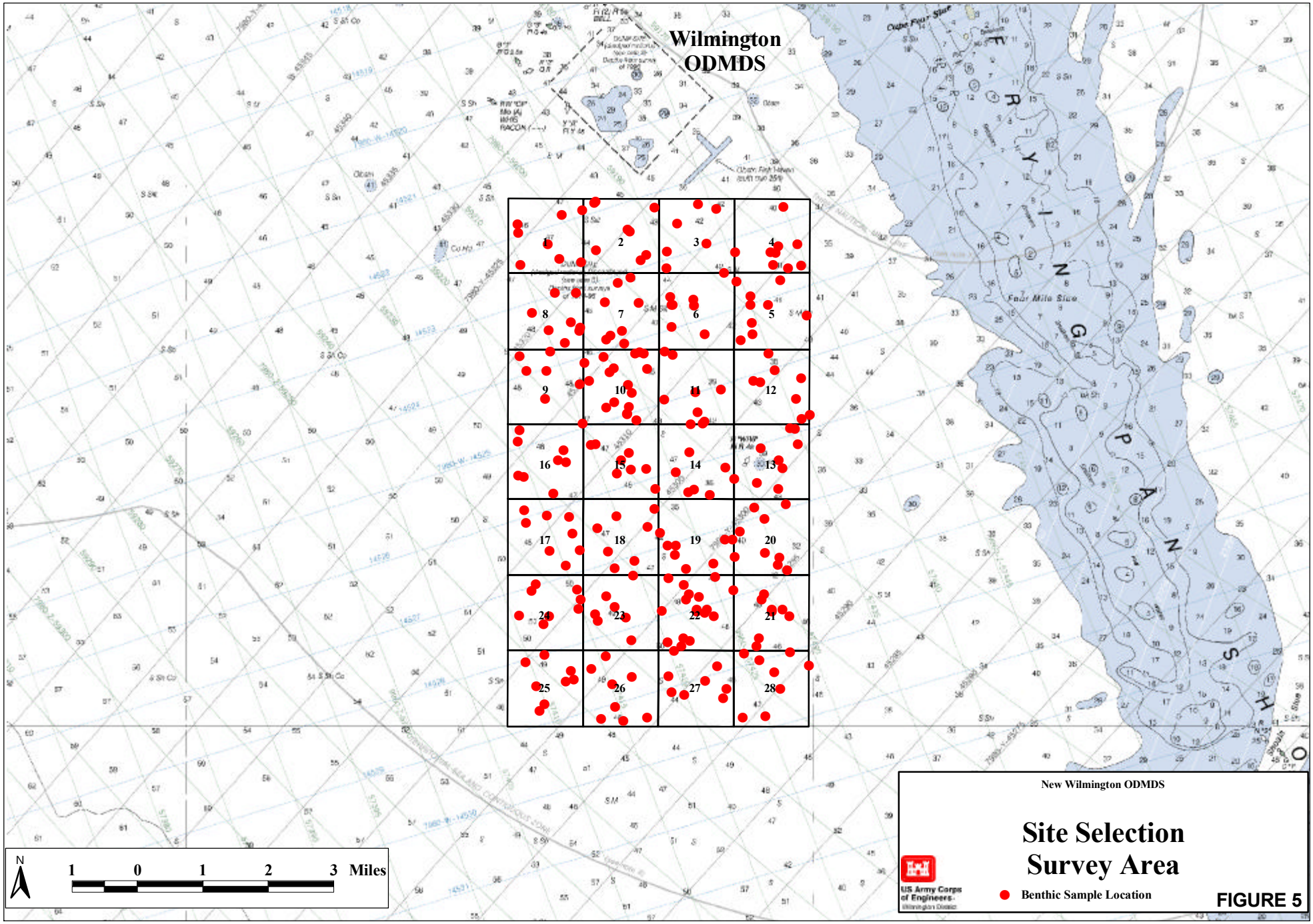
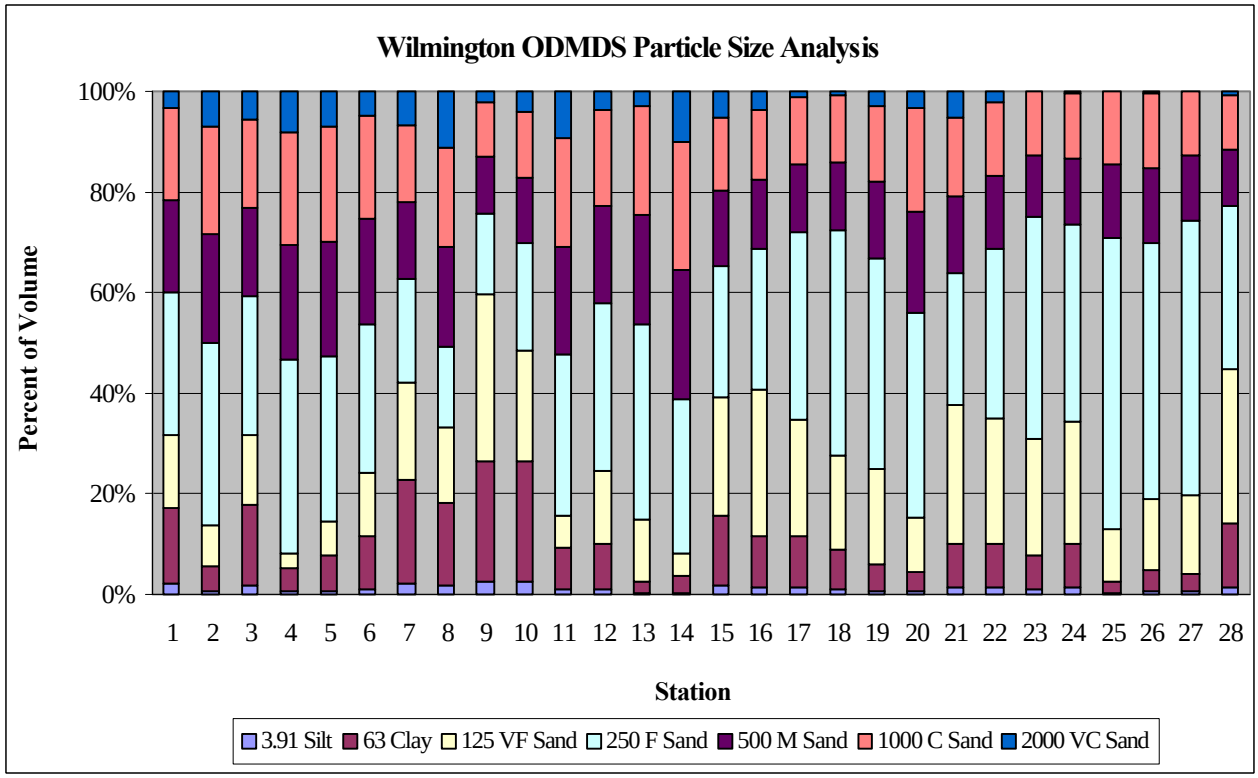

Wilmington
ODMDS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
N
1 0 1 2 3 Miles
New Wilmington ODMDS
Site Selection
Survey Area
Benthic Sample Location
US Army Corps of Engineers
FIGURE 5

Figure 6. Particle size distribution within new Wilmington site selection survey area. Distributions shown are the averages of analyses of the 8 (16 at stations 10 and 22) samples collected for each station indicated.



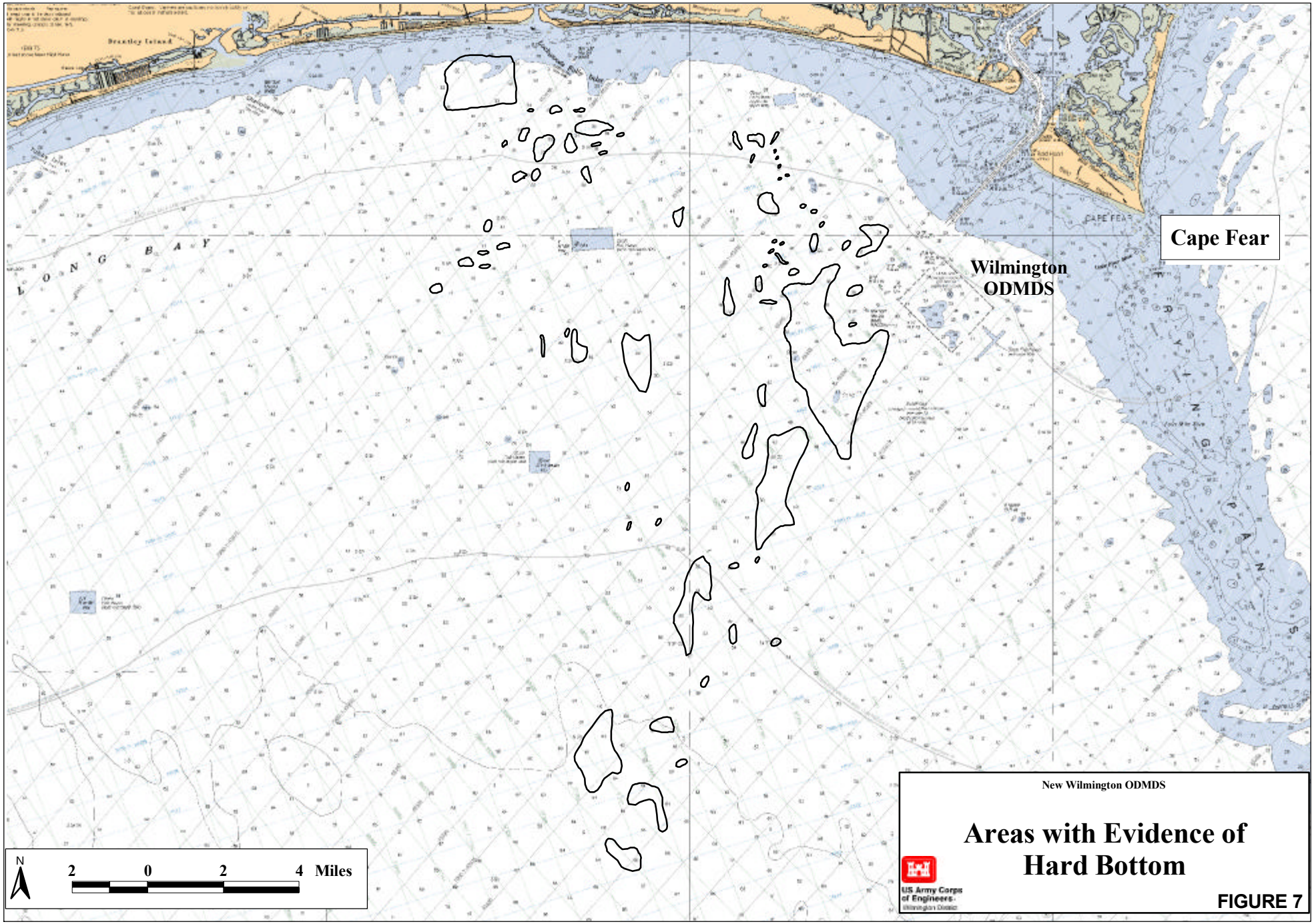

Cape Fear
Wilmington
ODMDS
LONG BAY
CAPE FEAR
N
2 0 2 4 Miles
New Wilmington ODMDS
Areas with Evidence of
Hard Bottom
US Army Corps
of Engineers
FIGURE 7

Table 2.2. Estimated ocean dredged material disposal requirements at Wilmington, North Carolina using current operations and maintenance methods and authorized new work.

	ANNUAL MAINTENANCE[1]					NEW WORK[1]			
Channel or Reach	Eagle Island	ODMDS	Ret. Factor[2]	1-Year Volume	50-Year Volume	Eagle Island	ODMDS	Ret. Factor	50-Year Volume
Baldhead Shoal and Entrance Channels		855,400	1	855,400	42,770,000		9,266,720	1	9,266,720
Lower Swash		12,000	1	12,000	600,000		119,940	1	119,940
Snow Marsh		14,800	1	14,800	740,000		392,350	1	392,350
Horseshoe Shoal		45,700	1	45,700	2,285,000		270,110	1	270,110
Reaves Point		21,200	1	21,200	1,060,000		323,280	1	323,280
Lower Midnight		25,500	0.65	16,575	828,750		626,770	1	626,770
Upper Midnight		107,000	0.65	69,550	3,477,500		1,087,510	1	1,087,510
Lower Lilliput		43,000	0.65	27,950	1,397,500		847,860	1	847,860
Upper Lilliput		48,900	0.65	31,785	1,589,250		661,050	1	661,050
Keg Island		34,100	0.65	22,165	1,108,250		570,300	1	570,300
Lower Big Island		8,000	0.65	5,200	260,000		334,780	1	334,780
Upper Big Island	2,400					358,250			
Lower Brunswick	29,800					606,300			
Upper Brunswick	17,100					368,000			
Fourth East Jetty	19,600					546,690			
Between Channel	61,500					216,080			
Anchorage Basin	932,900					1,295,553			
32-ft Project	14,100					506,849			
25-ft Project	12,600					737,329			
Wilmington Harbor Channel Widening[3]							4,433,000	1	4,433,000
MOTSU (routine maintenance - south and center basins)		1,406,332	0.65	914,116	70,316,600				
MOTSU (emergency mobilization - 5 times in 50 years)		3,000,000	0.65	1,950,000	9,750,000				
ANNUAL TOTAL		5,621,932		3,986,441					
50-YEAR TOTAL					136,182,850				18,933,670

TOTAL ODMDS REQUIRED VOLUME	Maintenance	136,182,850
	New Work	18933670
	TOTAL	**155,116,520**

Notes: [1] - Estimates for dredged material quantities obtained from Final Feasibility Report and EIS on Improvement of Navigation, Cape Fear - Northeast Cape Fear Rivers Comprehensive Study, Wilmington, NC, Volume I, June 1996. Maintenance volumes assume channel improvements are in place.

- MOTSU estimates obtained from MOTSU Improvements to Navigation Basins and Entrance Channels, FEIS, November 1994

[2] - Retention Factor is based on ocean dumping records and ODMDS bathymetric surveys from 1987 to 1994 and characteristics of the dredged materials. For coarser grade sands, a retention factor of 1.0 was used. For dredged material consisting of larger quantities of finer silts and clays, a factor of 0.65 was used.

[3] - Maintenance of the Wilmington Habor Widener is already included in the maintenance volumes indicated.